

CHAPTER 1

INTRODUCTION

1.1 Introduction

Antenna is a device for radiating or receiving electromagnetic wave in free space. The antenna is the interface between transmission lines and free space. There are two types of the antenna available which categories as an active and passive antenna respectively. Passive antenna is the reciprocal devices and it can be used for transmitting or receiving. Where else, active antenna is not the reciprocal devices. Antennas are now common place objects in everyday life and their inception. There has been continuing interest in reducing their physical size.

1.2 Objective

This project is mainly on giving exposure to design antennas with low frequency and small in size. To design an antenna systematic approach is very important in order to obtain antenna with best performance. Besides, the objective of this project is to understand important parameters need to be considered during designing an antenna. In addition the needs for smaller antennas has become increasingly important in recent year because the effect of large scale integration of electronic components generally isolates the antenna as the most bulky, heavy and obtrusive part of the equipment

In this project, size reduction techniques will be applied to reduce the antenna size without effect its performance.

1.3 Scope of the project

There are various types of antennas available in current situation. But in this project, only monopole antenna will be considered. Antenna that design should be performing in desired frequency or frequencies. If the single antenna can be tuning to more than one frequency will considered as multi band antenna. Therefore, this antenna called as dual band antenna because it will resonate at two different frequencies. The aim of this project is to design the dual band antenna to be operated in the MICS band which is from 402MHz to 405MHz and FRUSPL 50MHz ~ 1GHz to kills viruses. But seems there are no any recommendation for the range, frequency would chosen for FRUSPL band is from 150~153 MHz

1.4 Problem statement

The antenna design has been widely applied in communication system since year 1800. But the radiation pattern also can be applied for medical purpose. This is because the energy propagates thru our body cell can generate energy pattern to break the composition of the human body cell to change its characteristic. The same idea can be applied for reverse engineering. This is curing the affected cells to get back to its original position. But the limitation is frequency selection to perform this task because don't know on the best resonance frequency can be use for on body application without giving any undesired side effects. In additional, the on body antenna should be very small. The reason is high frequency not suitable for body application due to prevent any hazardous. Therefore, antennas with smaller size with low frequency highly recommended. So, have to perform

optimization to tune the antenna to become as smaller it can. Rectangular antenna and square patch antenna not suitable for body antenna because it will produce big antenna for lower frequency which is not practical.

Besides, the antenna performance also changes from point to point. In other word SAR on the body will be vary for different parts of body. The liquid that flow into our body also differ instead of density. Therefore, a single antenna cannot perform with same level of conductivity for whole body.

1.5 Project Outline

The understanding of basic function of the antenna is very important. Even though, there so many techniques and types of the antennas available but techniques should be accordance to application. (Refer to Figure 1.0)

In this design, printed monopole antenna has been selected. After that operating frequency has been selected. Upon frequency selection, mathematical computation and understating of formulation needed to design a microstrip simulation. In this design, CST simulator has been used to perform the simulation and to get the best return loss $|S_{11}|$. After that, the performance of the antenna will be determined base on gain obtain by the radiation pattern to evaluate the performance. In final, fabricate the antenna and test with spectrum analyzer to analysis real data obtained.

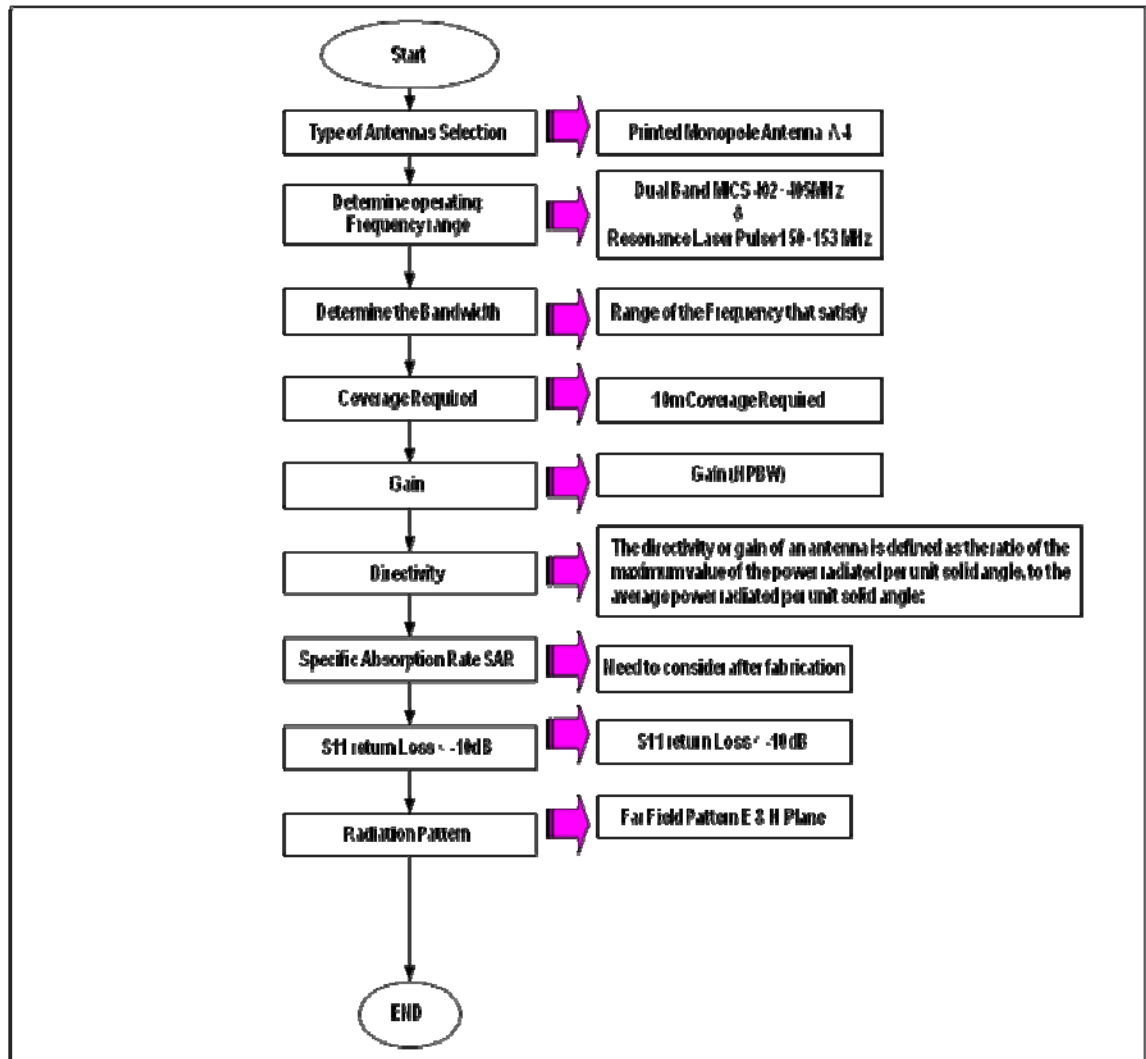


Figure 1.0: Project Outline

1.6 Summary

Antenna designing is one of the interest areas in RF theory. There is some proper approaches are required to achieve best design for antennas. Especially, the knowledge in operating and handling related software for simulation purpose and to obtain the result before transferred into fabrication. This is to avoid waste in term of time and money.